

WHAT IS CLAIMED IS:

1. A drainage device for draining a space or cavity defined by a wall, the drainage device comprising:

5 a) a first component comprising a proximal segment, an intermediate segment and a distal segment, where the intermediate segment and the distal segment function as an occlusion removing structure; and

b) a second component that functions as a drain;

where the drainage device comprises a proximal end and a distal end;

10 where the proximal end of the proximal segment comprises an instrument for creating an opening in the wall of the space or cavity;

where the intermediate segment comprises a proximal end and a distal end, and further comprises a hollow tube comprising a wall with an outer surface and an inner surface defining a central lumen;

15 where the distal segment comprises an elongated tubular mesh comprising a proximal end, a distal end, an outer surface and an inner surface defining a central lumen;

where the second component comprises a proximal end and a distal end, and further comprises a hollow tube comprising a wall with an outer surface and an inner surface defining a central lumen;

where the first component and the second component are non-integrally connected;

20 where the first component further comprises a proximal segment comprising a proximal end and a distal end;

where the distal end of the proximal segment is connected to the proximal end of the intermediate segment; and

25 where the distal end of the intermediate segment is connected to the proximal end of the distal segment.

2. The drainage device according to claim 1, where the instrument is a trocar.

3. The drainage device according to claim 1, where the instrument is bent or curved along its longitudinal axis.

4. The drainage device according to claim 1, where the distal end of the proximal segment comprises a first connector for joining the proximal segment to the intermediate segment.

5. The drainage device according to claim 4, where the inner surface of the wall of the hollow tube of the intermediate segment fits snugly over the distal end of the first connector of the proximal segment.

6. The drainage device according to claim 4, where the first connector integrally joins the proximal segment to the intermediate segment.

7. The drainage device according to claim 1, where the drainage device further comprises a proximal end, a distal end, and a drainage device axial length between the proximal end of the drainage device and the distal end of the drainage device; and where the first component extends substantially from the proximal end of the drainage device to the distal end of the drainage device.

8. The drainage device according to claim 1, where the distal end of the intermediate segment comprises a second connector for joining the intermediate segment to the second component non-integrally.

9. The drainage device according to claim 1, where the proximal end of the distal segment is integrally joined to the distal end of the intermediate segment.

10. The drainage device according to claim 1, where the hollow tube of the second component is flexible.

11. The drainage device according to claim 1, where the hollow tube of the intermediate segment is flexible.

12. The drainage device according to claim 1, where the hollow tube of the second component further comprises a plurality of apertures extending completely through the wall of the hollow tube of the second component, from the outer surface of the hollow tube of the second component to the inner surface of the hollow tube of the second component .

13. The drainage device according to claim 12, where the plurality of apertures are arranged in a plurality of rows.

14. The drainage device according to claim 1, where the second component further comprises a third connector at the proximal end of the second component; and

where the third connector is configured to mate non-integrally with the second connector on the distal end of the intermediate segment.

5 15. The drainage device according to claim 1, where the distal segment of the first component has a distal segment axial length extending from the proximal end of the tubular mesh to the distal end of the tubular mesh;

where the second component has a second component axial length extending from the proximal end of the second component to the distal end of the second component; and

10 where the distal segment axial length is between 60% and 100% of the second component axial length.

16. The drainage device according to claim 1, where the distal segment of the first component has a distal segment axial length extending from the proximal end of the tubular mesh to the distal end of the tubular mesh;

15 where the second component has a second component axial length extending from the proximal end of the second component to the distal end of the second component; and

where the distal segment axial length is between 70% and 100% of the second component axial length.

20 17. The drainage device according to claim 1, where the distal segment of the first component has a distal segment axial length extending from the proximal end of the tubular mesh to the distal end of the tubular mesh;

where the second component has a second component axial length extending from the proximal end of the second component to the distal end of the second component; and

25 where the distal segment axial length is between 80% and 100% of the second component axial length.

18. The drainage device according to claim 1, where the distal segment of the first component has a distal segment axial length extending from the proximal end of the tubular mesh to the distal end of the tubular mesh;

where the second component has a second component axial length extending from the proximal end of the second component to the distal end of the second component; and

where the distal segment axial length is between 90% and 100% of the second component axial length.

5 19. The drainage device according to claim 1, where the distal segment of the first component has a distal segment axial length extending from the proximal end of the tubular mesh to the distal end of the tubular mesh;

where the second component has a second component axial length extending from the proximal end of the second component to the distal end of the second component; and

10 where the distal segment axial length is between 95% and 100% of the second component axial length.

20. The drainage device according to claim 1, where the distal segment of the first component has a distal segment axial length extending from the proximal end of the tubular mesh to the distal end of the tubular mesh;

15 where the second component has a second component axial length extending from the proximal end of the second component to the distal end of the second component; and

where the distal segment axial length is between 99% and 100% of the second component axial length.

20 21. The drainage device according to claim 1, further comprising a third component comprising a proximal end, a distal end, and a hollow tube comprising a wall with an outer surface and an inner surface defining a central lumen; and

where the proximal end of the proximal segment fits snugly into the central lumen of the third component; and

where the third component is non-integral with the first component.

25 22. The drainage device according to claim 21, where the hollow tube of the third component is flexible.

23. The drainage device according to claim 1, further comprising one or more than one structure for securing the drainage device connected to the proximal end of the second component.

24. The drainage device according to claim 1, where the one or more than one structure is a loop.

25. A drainage device for draining a space or cavity defined by a wall, the drainage device comprising:

- 5 a) a first component comprising an intermediate segment and a distal segment; and
 b) a second component that functions as a drain;

 where the drainage device comprises a proximal end and a distal end;

 where the intermediate segment comprises a proximal end and a distal end, and further comprises a hollow tube comprising a wall with an outer surface and an inner
10 surface defining a central lumen;

 where the distal segment comprises an elongated tubular mesh comprising a proximal end, a distal end, an outer surface and an inner surface defining a central lumen;

 where the second component comprises a proximal end and a distal end, and further comprises a hollow tube comprising a wall with an outer surface and an inner surface
15 defining a central lumen;

 where the first component and the second component are non-integrally connected;
 and

 where the distal end of the intermediate segment is connected to the proximal end of the distal segment.

20 26. The drainage device according to claim 25, where the distal end of the intermediate segment comprises a second connector for joining the intermediate segment to the second component non-integrally.

 27. The drainage device according to claim 25, where the proximal end of the distal segment is integrally joined to the distal end of the intermediate segment.

25 28. The drainage device according to claim 25, where the hollow tube of the second component is flexible.

 29. The drainage device according to claim 25, where the hollow tube of the intermediate segment is flexible.

30. The drainage device according to claim 25, where the hollow tube of the second component further comprises a plurality of apertures extending completely through the wall of the hollow tube of the second component, from the outer surface of the hollow tube of the second component to the inner surface of the hollow tube of the second component .

31. The drainage device according to claim 25, where the plurality of apertures are arranged in a plurality of rows.

32. The drainage device according to claim 25, where the second component further comprises a third connector at the proximal end of the second component; and where the third connector is configured to mate non-integrally with the second connector on the distal end of the intermediate segment.

33. The drainage device according to claim 25, where the distal segment of the first component has a distal segment axial length extending from the proximal end of the tubular mesh to the distal end of the tubular mesh;

where the second component has a second component axial length extending from the proximal end of the second component to the distal end of the second component; and

where the distal segment axial length is between 60% and 100% of the second component axial length.

34. The drainage device according to claim 25, where the distal segment of the first component has a distal segment axial length extending from the proximal end of the tubular mesh to the distal end of the tubular mesh;

where the second component has a second component axial length extending from the proximal end of the second component to the distal end of the second component; and

where the distal segment axial length is between 70% and 100% of the second component axial length.

35. The drainage device according to claim 25, where the distal segment of the first component has a distal segment axial length extending from the proximal end of the tubular mesh to the distal end of the tubular mesh;

where the second component has a second component axial length extending from the proximal end of the second component to the distal end of the second component; and

where the distal segment axial length is between 80% and 100% of the second component axial length.

5 36. The drainage device according to claim 25, where the distal segment of the first component has a distal segment axial length extending from the proximal end of the tubular mesh to the distal end of the tubular mesh;

where the second component has a second component axial length extending from the proximal end of the second component to the distal end of the second component; and

10 where the distal segment axial length is between 90% and 100% of the second component axial length.

37. The drainage device according to claim 25, where the distal segment of the first component has a distal segment axial length extending from the proximal end of the tubular mesh to the distal end of the tubular mesh;

15 where the second component has a second component axial length extending from the proximal end of the second component to the distal end of the second component; and

where the distal segment axial length is between 95% and 100% of the second component axial length.

20 38. The drainage device according to claim 25, where the distal segment of the first component has a distal segment axial length extending from the proximal end of the tubular mesh to the distal end of the tubular mesh;

where the second component has a second component axial length extending from the proximal end of the second component to the distal end of the second component; and

25 where the distal segment axial length is between 99% and 100% of the second component axial length.

39. The drainage device according to claim 25, further comprising a third component comprising a proximal end, a distal end, and a hollow tube comprising a wall with an outer surface and an inner surface defining a central lumen; and

where the proximal end of the proximal segment fits snugly into the central lumen of the third component; and

where the third component is non-integral with the first component.

40. The drainage device according to claim 22, where the hollow tube of the third component is flexible.

41. The drainage device according to claim 25, further comprising one or more than one structure for securing the drainage device connected to the proximal end of the second component.

42. The drainage device according to claim 25, where the one or more than one structure is a loop.

43. A drainage device for draining a space or cavity defined by a wall, the drainage device comprising means for drainage and means for removing an occlusion.

44. A kit for removing an occlusion from an occluded drain comprising a drainage device according to claim 1, and further comprising an introducer.

45. A kit for removing an occlusion from an occluded drain comprising a drainage device according to claim 25, and further comprising an introducer.

46. The kit according to claim 44, where the introducer comprises a replacement occlusion removing structure.

47. The kit according to claim 45, where the introducer comprises a replacement occlusion removing structure.

48. A kit for removing an occlusion from an occluded drain comprising an introducer and comprising an occlusion removing structure;

where the occlusion removing structure comprises a tubular mesh.

49. The kit of claim 48, where the tubular mesh is preloaded into the introducer.

50. A method for draining a cavity or space with a drain, and unoccluding the drain, the method comprising:

a) selecting a space or cavity to be drained, where the space or cavity comprises a wall substantially defining the space or cavity to be drained;

b) providing a drainage device according to claim 1;

c) placing the distal end of the drainage device within the space or cavity to be drained through a first opening;

d) using the proximal end of the proximal segment to create a second opening in the wall of the space or cavity to be drained, and advancing the proximal segment completely through the second opening created in the wall, before or after placing the distal end of the drainage device within the space or cavity to be drained through a first opening;

e) allowing the distal end of the second component of the drainage device to remain in place for an extended period of time in order to drain drainage material from the space or cavity into the central lumen of the tubular mesh;

f) allowing the second component to become occluded with drainage material; and
g) withdrawing the tubular mesh proximally from the second component, thereby binding the occluding drainage material within the tubular mesh, and thereby unoccluding the second component.

51. The method of claim 50, where the space or cavity is within a human.

52. The method of claim 50, where the space or cavity is created by a surgical procedure.

53. The method of claim 50, where the first opening is a naturally existing opening.

54. The method of claim 50, where the first opening is a man-made opening.

55. The method of claim 50, where the first opening is a surgical incision.

56. The method of claim 50, where withdrawing the tubular mesh proximally comprises rotating the intermediate segment relative to the second component, and then by axially sliding the intermediate segment proximally relative to the second component.

57. The method of claim 50, further comprising separating the proximal segment of the first component from the intermediate segment after creating the second opening in the wall of the space or cavity.

58. The method of claim 50, where the drainage device further comprises a third component comprising a proximal end, a distal end, and a hollow tube comprising a wall with an outer surface and an inner surface defining a central lumen; and

where the proximal end of the proximal segment fits snugly into the central lumen of the third component;

where the third component is non-integral with the first component; and

5 where the method further comprises removing the third component by axially sliding the third component proximally relative to the first component.

59. The method of claim 50, where the first opening through which the distal end of the drainage device is placed is closed after placing the distal end of the drainage device within the space or cavity.

10 60. The method of claim 59, where the first opening is closed by suturing or stapling.

61. The method of claim 50, further comprising withdrawing the second component from the space or cavity after withdrawing the tubular mesh proximally from the second component.

15 62. The method of claim 50, where the drainage device further comprises one or more than one structure for securing the drainage device connected to the proximal end of the second component; and

where the method further comprises attaching the one or more than one structure to a surface to anchor the drainage device.

20 63. The method of claim 62, further comprising detaching the one or more than one structure from the surface before withdrawing the second component.

64. The method of claim 50, further comprising closing the second opening after withdrawing the second component.

25 65. The method of claim 50, further comprising attaching the proximal end of the intermediate segment to a suction device after placing the distal end of the drainage device in the space or cavity.

66. The method of claim 50, further comprising attaching the proximal end of the second component to a suction device after withdrawing the tubular mesh.

67. The method of claim 50, further comprising cutting the distal end of the drainage device before placing the drainage device within the space or cavity.

68. The method of claim 67, where cutting the distal end of the drainage device causes the cut distal end of the tubular mesh to retract slightly into the cut distal end of the second component, thereby preventing sharp points of the distal end of the tubular mesh from damaging the wall of the space or cavity during use of the drainage device.

5 69. The method of claim 50, further comprising providing a replacement occlusion removing structure, and inserting the replacement occlusion removing structure into the second component after unoccluding the second component.

10 70. The method of claim 69, further comprising repeating the step of providing a replacement occlusion removing structure, and inserting the replacement occlusion removing structure into the second component after unoccluding the second component.

71. The method of claim 69, where providing a replacement occlusion removing structure, and inserting the replacement occlusion removing structure into the second component after unoccluding the second component comprises:

- 15 a) providing an introducer comprising a proximal end and a distal end;
- b) loading the replacement occlusion removing structure into an introducer to create a loaded introducer; and
- c) inserting the distal end of the introducer containing the replacement occlusion removing structure into the proximal end of the second component.

20 72. A method for draining a cavity or space with a drain, and unoccluding the drain, the method comprising:

- a) selecting a space or cavity to be drained, where the space or cavity comprises a wall substantially defining the space or cavity to be drained;
- b) providing a drainage device according to claim 25;
- c) placing the distal end of the drainage device within the space or cavity to be drained through a first opening;
- 25 d) allowing the distal end of the second component of the drainage device to remain in place for an extended period of time in order to drain drainage material from the space or cavity into the central lumen of the tubular mesh;
- e) allowing the second component to become occluded with drainage material; and

f) withdrawing the tubular mesh proximally from the second component, thereby binding the occluding drainage material within the tubular mesh, and thereby unoccluding the second component.

73. The method of claim 72, where the space or cavity is within a human.

5 74. The method of claim 72, where the space or cavity is created by a surgical procedure.

75. The method of claim 72, where the first opening is a naturally existing opening.

76. The method of claim 72, where the first opening is a man-made opening.

77. The method of claim 72, where the first opening is a surgical incision.

10 78. The method of claim 72, where withdrawing the tubular mesh proximally comprises rotating the intermediate segment relative to the second component, and then by axially sliding the intermediate segment proximally relative to the second component.

15 79. The method of claim 72, further comprising withdrawing the second component from the space or cavity after withdrawing the tubular mesh proximally from the second component.

80. The method of claim 72, where the drainage device further comprises one or more than one structure for securing the drainage device connected to the proximal end of the second component; and

20 where the method further comprises attaching the one or more than one structure to a surface to anchor the drainage device.

81. The method of claim 80, further comprising detaching the one or more than one structure from the surface before withdrawing the second component.

25 82. The method of claim 72, further comprising attaching the proximal end of the intermediate segment to a suction device after placing the distal end of the drainage device in the space or cavity.

83. The method of claim 72, further comprising attaching the proximal end of the second component to a suction device after withdrawing the tubular mesh.

84. The method of claim 72, further comprising cutting the distal end of the drainage device before placing the drainage device within the space or cavity.

85. The method of claim 84, where cutting the distal end of the drainage device causes the cut distal end of the tubular mesh to retract slightly into the cut distal end of the second component, thereby preventing sharp points of the distal end of the tubular mesh from damaging the wall of the space or cavity during use of the drainage device.

5 86. The method of claim 72, further comprising providing a replacement occlusion removing structure, and inserting the replacement occlusion removing structure into the second component after unoccluding the second component.

10 87. The method of claim 86, further comprising repeating the step of providing a replacement occlusion removing structure, and inserting the replacement occlusion removing structure into the second component after unoccluding the second component.

88. The method of claim 72, further comprising closing the first opening after placing the distal end of the drainage device within the space or cavity.

89. The method of claim 89, where the first opening is closed by suturing or stapling.

15 90. The method of claim 72, further comprising creating a second opening using an instrument separate from the drainage device.

91. The method of claim 90, further comprising closing the second opening after withdrawing the second component.